dcr
Massachusetts

# Preliminary Results of the 2006 Quabbin Reservation Moose Survey

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Massachusetts Department of Conservation and Recreation
Division of Water Supply Protection
Office of Watershed Management

# Preliminary Results of the 2006 Quabbin Reservation Moose Survey

Moose are North America's largest wild animal. An average adult moose weighs around 1,000 pounds and stands 6 feet at the shoulder. Moose and their ancestors originated in Siberia and made their way to North America across the Bering land bridge. At the time of European settlement, moose were distributed from Alaska, across Canada into the northern United States from North Dakota east to Pennsylvania and all of New England, including Massachusetts. Moose also extended down the Rocky Mountains in the West. Temperature was probably the limiting factor in the southern distribution of moose in North America. Because moose are adapted to cold northern climates, winter stress typically occurs when temperatures exceed 23°F and summer stress when temperatures are >59°F (Franzmann and Schwartz 1997).

Moose were extirpated from Massachusetts by the early to mid- 1800s (Peek and Morris 1998, Veccillio et al. 1993). A small number of moose escaped from a game preserve in Berskshire County around 1911 and may have persisted for several years (Veccillio et al. 1993). Most sightings during the next 50 years were probably northern moose who wandered south. Since the late 1980s, the number of moose sightings has increased greatly (Peek and Morris 1998). In 1998, the state's moose population was estimated as at least 75 animals including cows with calves (Peek and Morris 1998). In 2006, the estimate had increased to about 1,000 animals. Reasons for the increase in moose populations include the absence of predators, reversion of farms to forested areas, legal protection, increased wetlands from expanding beaver populations, and larger forest openings (Franzmann and Schwartz 1997).

Moose populations continue to expand in Massachusetts. DCR land in the Quabbin and Ware River watersheds represent some of the best moose habitat in the state. Given their tremendous size and appetites (moose can eat 40-60 pounds of browse daily), the Division of Water Supply Protection is interested in how many moose are present on Division lands and their life histories. In order to address these questions, the DCR initiated a moose survey last fall utilizing hunters participating in the annual Quabbin controlled deer hunt.

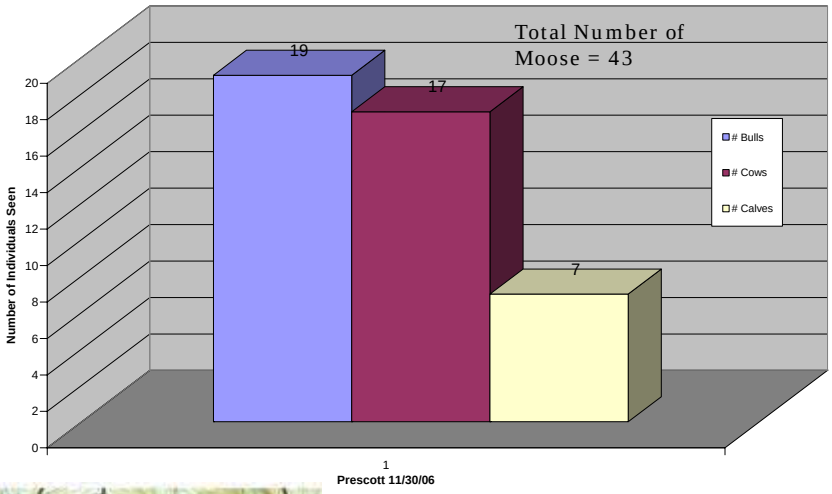
## Quabbin Hunter Survey

The Quabbin Reservation controlled deer hunt takes place each year as hundreds of hunters take to the woods in search of deer. In the past, DCR staff noticed that in addition to deer, hunters often saw a lot of moose. In order to capitalize on this excellent source of information, the DCR handed out a formal moose sighting survey to hunters during the 2006 hunt. Hunters were given survey cards and were asked to keep an eye out for moose as they were hunting. When a moose was sighted, the hunter filled in the time of the sighting, their location, and what kind of animal they saw. Hunters then turned in their cards at the end of the day. Surveys were administered in all the hunting blocks (Prescott, Pelham, New Salem, and Petersham). Survey information was then compiled and mapped for each block.

## Prescott

Approximately 360 hunters attended the Prescott hunt on the first day, and 298 turned in a card at the end of the day (about 83%). Ninety-two hunters saw at least 1 moose, and 206 hunters didn't see any moose. In the end, there were 81 unique moose sightings,

Fig. 1. Total number of individual moose seen during the Prescott deer hunt, 11/30/06



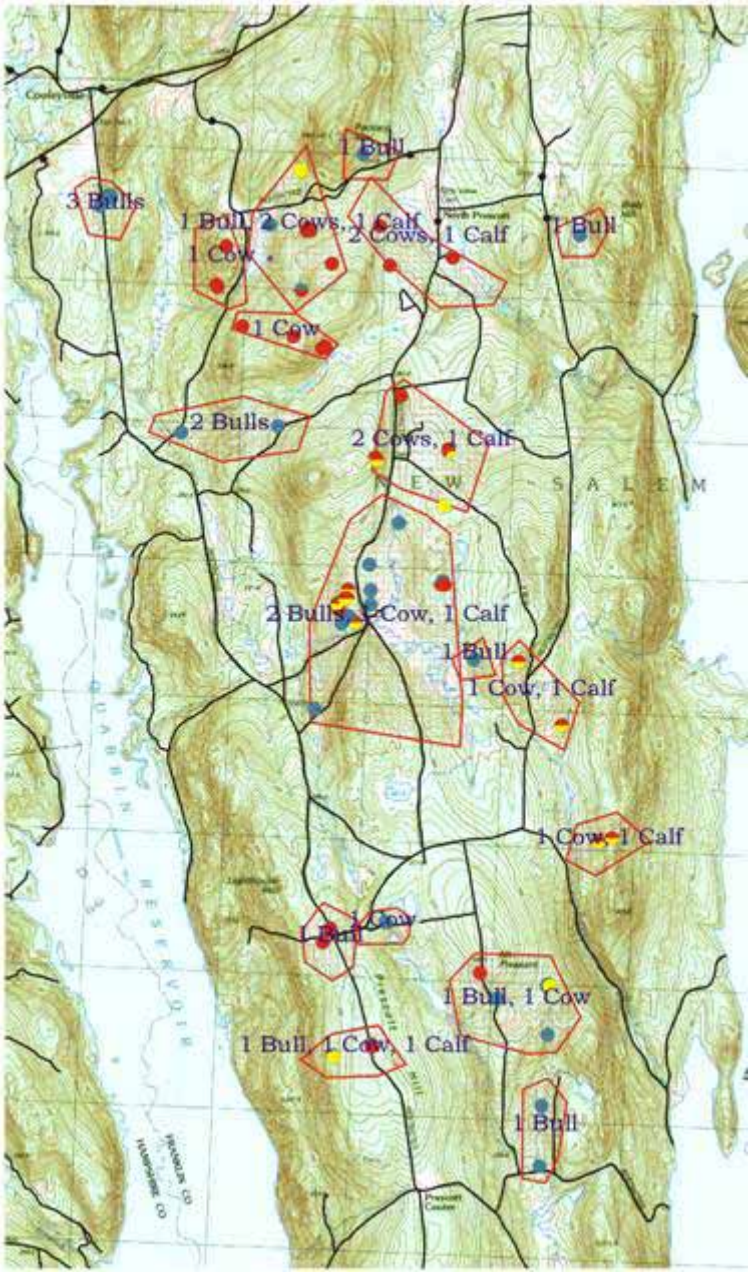




Fig. 2. Locations of moose on Prescott Peninsula seen by hunters on November 30th, 2006

and 11 unusable sightings (i.e. they didn't provide a location). Several days were spent in the office trying to determine how many of the 81 sightings were actually different moose. Using the information on the card (time animal was sighted, was it a bull, cow, etc.) we concluded that there were 43 moose just on the Prescott peninsula (Fig. 1)!

In order to get a sense of how the moose were distributed, we plotted all unique locations on a map (Fig. 2). This also helped us determine which sightings were truly unique and which ones were the same animal. The map indicated that moose were distributed throughout the peninsula, although more moose were seen in the northern end.

## Petersham

Around 300 hunters attended the Petersham hunt on the first day. Every hunter was given a survey card on the way in. At the end of the day, 233 cards (78%) had been turned in. A total of 67 cards was turned in that indicated a moose had been seen. In the end, there were 50 sightings that could be used in the analysis.

Fig. 3. Total number of moose seen during the Petersham deer hunt 12/7/06

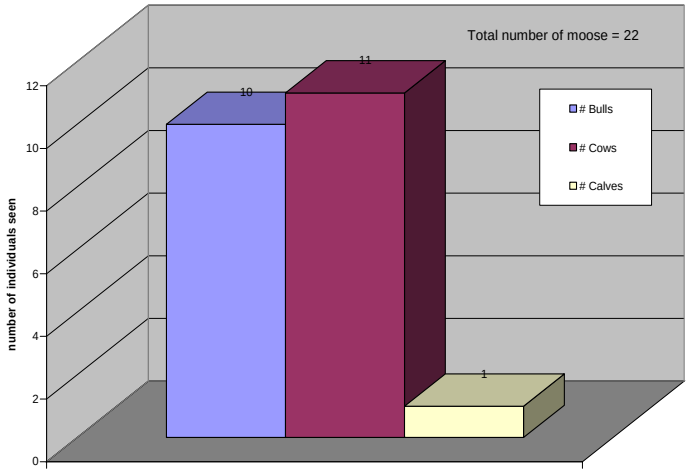
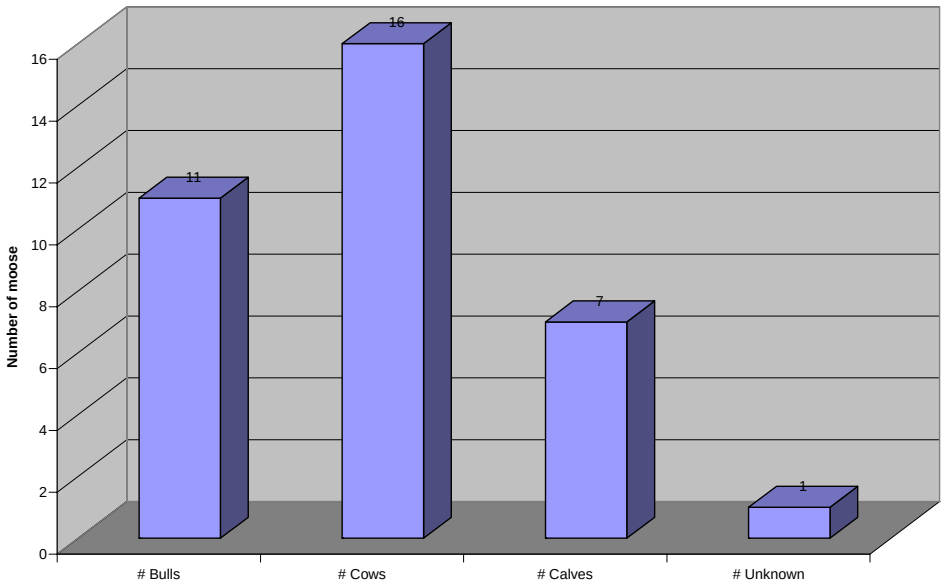




Fig. 4. Locations of moose seen by hunters in Petersham on December 7, 2006.

When the data was analyzed, we concluded that there were 22 individual moose sighted in the Petersham block (Fig. 3). Individual locations were plotted on a map and then polygons were drawn around those unique animals (Fig. 4). As you can see, moose were sighted all over the Petersham zone. It is also interesting to note how often the GPS collared moose was seen – he was seen 12 times during the course of the day.

Fig. 5. Total number of moose seen during the Pelham hunt, 11/30/2006




## Pelham

Approximately 350 hunters attended the Pelham hunt on the first day. Around 302 cards were turned in at the end of the day for a response rate of about 86%. In the end, there were 86 cards turned in that had a moose sighting on them. When the data was analyzed, we determined that the minimum number of moose in the Pelham block was 35 (Fig 5). Most of the sightings were of cows, although many bulls were sighted as well. The distribution of the sightings is seen in Fig. 6. In this case, only individual sightings were plotted. In the future, unique polygons will be drawn to indicate distinct individuals.

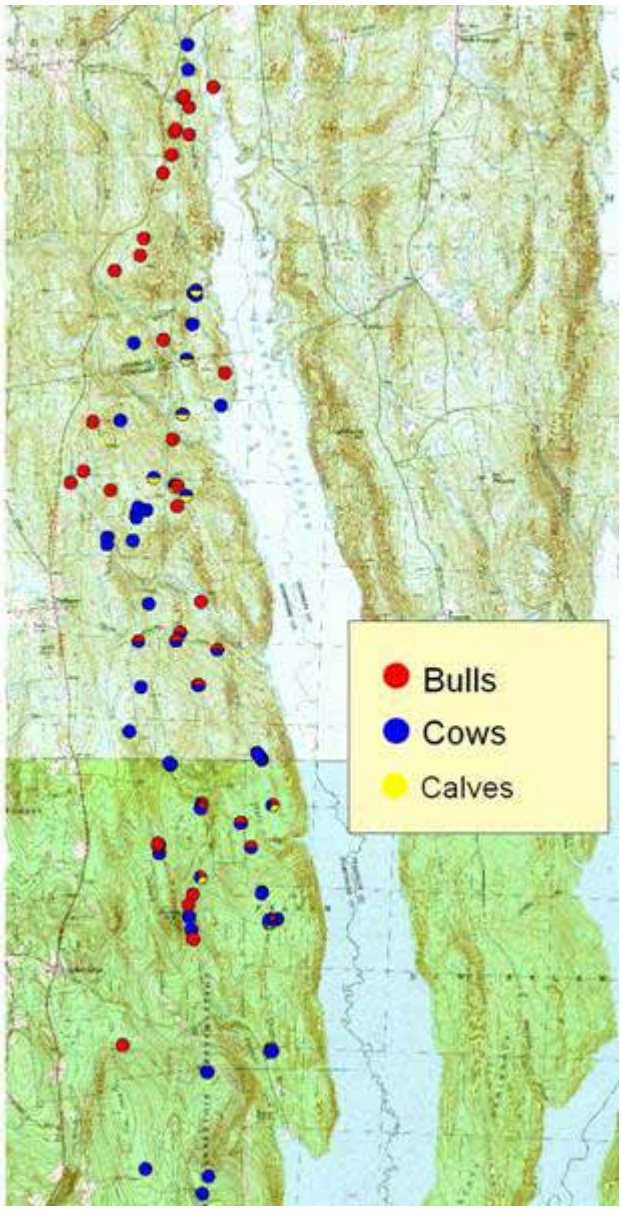
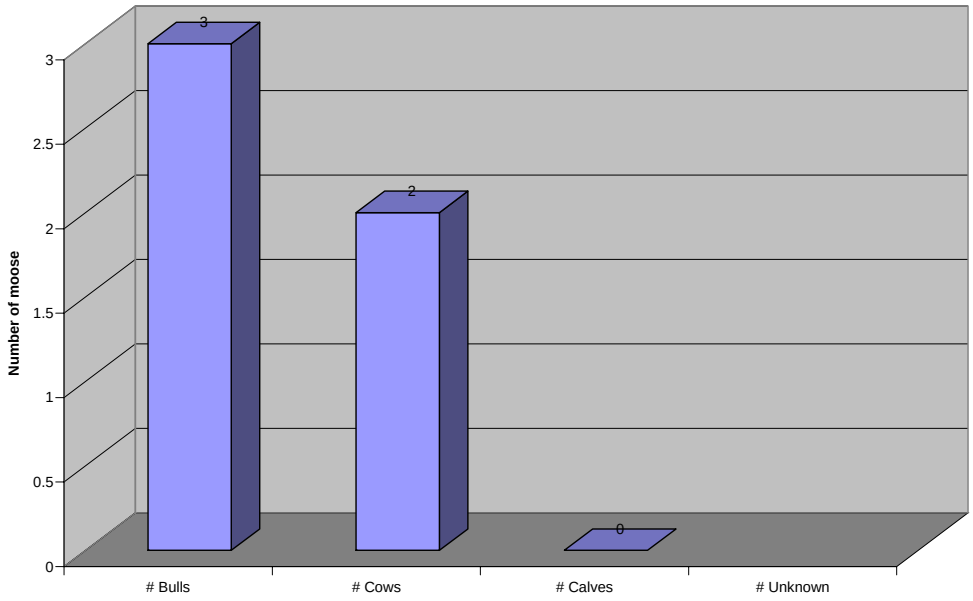



Fig 6. Locations of sighted moose during the Pelham hunt, 2006

## New Salem

Approximately 143 hunters attended the opening day of the New Salem hunt. On their way out, 130 hunters turned in their cards, resulting in a response rate of 91%. In the end, 10 hunters turned in cards with moose sightings on them. After the data was analyzed, we concluded there was a minimum of 5 moose in the New Salem block (Fig. 7).

**Fig. 7. Total number of moose seen during the New Salem hunt, 12/7/06**




The distribution of the moose sightings is seen in Figure 8. Again, as in the Pelham block, no unique polygons have been drawn around the individual sightings. These will be added soon.

## Ongoing Research

The hunter survey will continue during the 2007 Quabbin controlled deer hunt. In addition to those studies, the DCR contracted with a company this spring to conduct aerial infra-red surveys of Quabbin reservation to identify both deer and moose. Hopefully the combination of all this information will provide a much clearer picture of not only how many moose are out there, but how they are interacting with the environment.

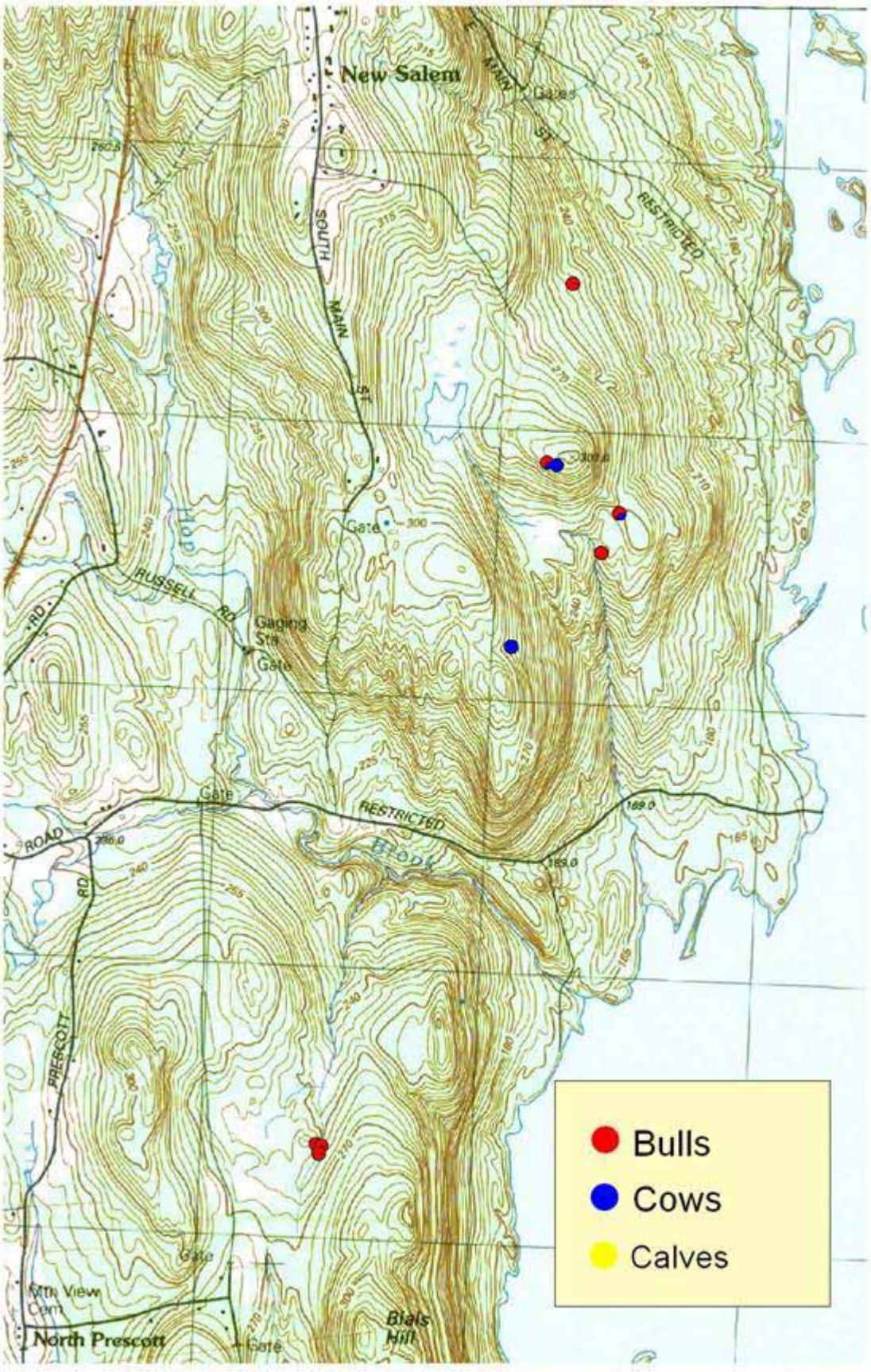



Fig. 8. Locations of moose sighting in the New Salem block, 2006